# Decreased flow-mediated vasodilation indicates endothelial dysfunction in dogs with severe stages of myxomatous mitral valve disease

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DECREASED FLOW-MEDIATED VASODILATION INDICATES ENDOTHELIAL DYSFUNCTION IN DOGS WITH SEVERE STAGES OF MYXOMATOUS MITRAL VALVE DISEASE. SG Moesgaard, C Klostergaard, M Molin, NE Zois, TB Falk, CE Rasmussen, LH Olsen. Department of Basic Animal and Veterinary Sciences, The Faculty of Life Sciences, University of Copenhagen, Denmark.

Myxomatous mitral valve disease (MMVD) is a common heart valve disease in dogs. Cavalier King Charles Spaniels (CKCS) is a dog breed that is highly predisposed for the development of MMVD. Studies of plasma biomarkers of endothelial function indicate that CKCS with MMVD may have endothelial dysfunction. However, biomarkers are an indirect measurement of endothelial function and they have been shown to be affected by several other conditions. The aim of the present study was to measure endothelial function directly by the use of the technique flow-mediated vasodilation (FMD) in dogs with increasing severity of MMVD.

A 13MHz linear probe was used to record 2D images of the brachial artery. A blood pressure cuff was inflated distal to the imaging site to a pressure above 200mmHg for 5 minutes. 2D imaging was performed 3 minutes post-occlusion. Commercially available software was used to measure vessel diameter and the peak of post-occlusion was compared with baseline to calculate percentage increase (FMD). Before starting the clinical study, a pilot study was performed in 5 healthy dogs (different breeds) where FMD was measured 5 times over a period of 5 weeks. The clinical study included 4 groups of CKCS: 1) 11 CKCS with minimal mitral regurgitation (MR), 2) 8 CKCS with mild MR, 3) 12 CKCS with moderate to severe MR and 4) 8 CKCS with clinical signs of heart failure due to MMVD. All dogs underwent a clinical examination, blood sampling for complete blood count and serum biochemistry and echocardiography prior to the FMD measurement.

The pilot study showed that it is possible to measure an increase in post-occlusion vessel diameter in healthy dogs. In the clinical study a decreased FMD response in CKCS with moderate to severe MR (5.86±3.46%) and CKCS with clinical signs of heart failure (4.98±2.44%) was found compared to the FMD response in CKCS with minimal (8.26±5.40%) and mild MR (8.98±3.41%). When the FMD responses in groups 1 and 2 were pooled and compared to pooled responses of groups 3 and 4, the FMD response was significantly decreased in the dogs with moderate to severe MR and dogs with clinical signs of heart failure (8.56±4.57% vs 5.51±3.05%, $P$=0.02). The FMD response decreased with increasing MR ($P$=0.055). The FMD response did not correlate with body weight, age or ambient temperature.

These results support the previous findings in plasma biomarker studies indicating that CKCS with severe stages of MMVD have endothelial dysfunction. However, the use of the FMD technique is challenging and larger number of dogs should be studied in order to evaluate the effect of increasing age and the correlation between the FMD response and relevant plasma biomarkers.